# Behavioral Ecology and Sociobiology

Volume 18 1985/86

Managing Editor:

**Hubert Markl**
Fakultät für Biologie der Universität Konstanz
Postfach 5560
D-7750 Konstanz
Federal Republic of Germany

Editors:

**Bert Hölldobler**
Department of Biology
Harvard University, MCZ Laboratories
Oxford Street
Cambridge, MA 02138, USA

**Peter Marler**
Rockefeller University
New York, NY 10021, USA

**John Maynard Smith**
School of Biological Sciences
University of Sussex, Falmer
Brighton BN1 9QG, Great Britain

**Edward O. Wilson**
Department of Biology
Harvard University, MCZ Laboratories
Oxford Street
Cambridge, MA 02138, USA

Advisory Editors:

J. Alcock, Tempe, AZ
M. Andersson, Göteborg
M.C. Baker, Fort Collins, CO
G.W. Barlow, Berkeley, CA
J.W. Bradbury, La Jolla, CA
J. Brown, Albany, NY
E.L. Charnov, Salt Lake City, UT
R.H. Crozier, Kensington, N.S.W.
D.A. Dewsbury, Gainesville, FL
T. Eisner, Ithaca, NY
V. Geist, Calgary, Alberta
D.R. Griffin, New York, NY
W.D. Hamilton, Oxford
G. Hausfater, Columbia, MO
K. Immelmann, Bielefeld
J.R. Krebs, Oxford
M. Lindauer, Würzburg
C.D. Michener, Lawrence, KS
G.H. Orians, Seattle, WA
A.V. Popov, Leningrad
Y. Sugiyama, Inuyama City, Aichi
C. Vogel, Göttingen
C. Walcott, Ithaca, NY
M.J. West Eberhard, Costa Rica

Springer International

# Behavioral Ecology and Sociobiology

**Copyright**

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere, that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders.

All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e.g., as offprints), as well as all translation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.

The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.

While the advice and information in this journal is believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

*Special regulations for photocopies in the USA*

Photocopies may be made for personal or in-house use beyond the limitations stipulated under Section 107 or 108 of U.S. Copyright Law, provided a fee is paid. This fee is US $0.20 per page, or a minimum of US $1.00 if an article contains fewer than five pages. All fees should be paid to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA, stating the ISSN 0340-5443, the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.

*Other regulations*

Authors publishing in this journal can, under certain conditions, benefit from library and photocopy fees collected by VG WORT. Authors of German nationality and those resident in the Federal Republic of Germany or Berlin (West), as well as citizens of Austria, Switzerland and member countries of the European community, may apply to Verwertungsgesellschaft WORT, Abteilung Wissenschaft, Goethestrasse 49, D-8000 München 2, for detailed information.

Springer-Verlag Berlin Heidelberg New York Tokyo
Printers: Universitätsdruckerei H. Stürtz AG, D-8700 Würzburg
Printed in Germany – © Springer-Verlag Berlin Heidelberg 1986
Springer-Verlag GmbH & Co KG, D-1000 Berlin 33

**Springer-Verlag**
Journal Production Dept. I
Postfach 105280
D-6900 Heidelberg 1
Telephone (06221) 487-336
Telex 461723

**Springer-Verlag**
Heidelberger Platz 3
D-1000 Berlin 33
Telephone (030) 8207-1
Telex 183319

# Contents


Armitage, K.B.: Individual differences in the behavior of juvenile yellow-bellied marmots . . . . . 419
Avery, M.I., see McGregor, P.K. . . . . 311
Barnard, C.J., Brown, C.A.J., Houston, A.I., McNamara, J.M.: Risk-sensitive foraging in common shrews: an interruption model and the effects of mean and variance in reward rate . . . . . 139
Beletsky, L.D., Higgins, B.I., Orians, G.H.: Communication by changing signals: call switching in red-winged blackbirds . . . . . 221
Boomsma, J.J., Isaaks, J.A.: Energy investment and respiration in queens and males of *Lasius niger* (Hymenoptera: Formicidae) . . . . . 19
Borgia, G.: Bower destruction and sexual competition in the satin bowerbird (*Ptilonorhynchus violaceus*) . . . 91
Bradbury, J.W., see Gibson, R.M. . . . . 117
Brown, C.A.J., see Barnard, C.J., et al. . . . . 139
Burghardt, G.M., Rand, A.S.: Group size and growth rate in hatchling green iguanas (*Iguana iguana*) . . . 101
Carlin, N.F., see Hölldobler, B. . . . . 45
Carlisle, T.R., Zahavi, A.: Helping at the nest, allofeeding and social status in immature arabian babblers . . . 339
Cash, K.J., Evans, R.M.: Brood reduction in the American white pelican (*Pelecanus erythrorhynchos*) . . . 413
Cole, B.J.: The social behavior of *Leptothorax allardycei* (Hymenoptera, Formicidae): time budgets and the evolution of worker reproduction . . . . . 165
Coleman, R.M., Gross, M.R., Sargent, R.C.: Parental investment decision rules: a test in bluegill sunfish . . 59
Colwell, M.A., see Reynolds, J.D., et al. . . . . 303
Cooke, F., see Reynolds, J.D., et al. . . . . 303
Craig, J.L., Douglas, M.E.: Resource distribution, aggressive asymmetries and variable access to resources in the nectar feeding bellbird . . . . . 231
Crewe, R., see Peeters, Ch. . . . . 29
Crozier, R.H., Page, R.E.: On being the right size: male contributions and multiple mating in social Hymenoptera . . . . . 105
Curio, E., see Klump, G.M., et al. . . . . 317
Dewsbury, D.A., see Shapiro, L.E. . . . . 267
Dickinson, J.L.: Prolonged mating in the milkweed leaf beetle *Labidomera clivicollis clivicollis* (Coleoptera: Chrysomelidae): a test of the "sperm-loading" hypothesis . . . . . 331
Diehl, P., Helb, H.-W.: Radiotelemetric monitoring of heart-rate responses to song playback in blackbirds (*Turdus merula*) . . . . . 213
Douglas, M.E., see Craig, J.L. . . . . 231
Erkert, H.G., Nagel, B., Stephani, I.: Light and social effects on the free-running circadian activity rhythm in common marmosets (*Callithrix jacchus*; Primates): social masking, pseudo-splitting, and relative coordination . . . . . 443
Evans, R.M., see Cash, K.J. . . . . 413
Fincke, O.M.: Underwater oviposition in a damselfly (Odonata: Coenagrionidae) favors male vigilance, and multiple mating by females . . . . . 405
FitzGerald, G.J., see Whoriskey, F.G. . . . . 15
Franks, N.R.: Teams in social insects: group retrieval of prey by army ants (*Eciton burchelli*, Hymenoptera: Formicidae) . . . . . 425
Franks, P., Lenington, S.: Dominance and reproductive behavior of wild house mice in a seminatural environment correlated with T-locus genotype . . . . . 395
Getz, L.L., Hofmann, J.E.: Social organization in free-living prairie voles, *Microtus ochrogaster* . . . . . 275
Gibson, R.M., Bradbury, J.W.: Sexual selection in lekking sage grouse: phenotypic correlates of male mating success . . . . . 117
Gross, M.R., see Coleman, R.M., et al. . . . . 59
Harrison, P.A., Littlejohn, M.J.: Diphasy in the advertisement calls of *Geocrinia laevis* (Anura: Leptodactylidae): vocal responses of males during field playback experiments . . . . . 67
Helb, H.-W., see Diehl, P. . . . . 213
Heller, K.-G., Helversen, D. von: Acoustic communication in phaneropterid bush-crickets: species-specific delay of female stridulatory response and matching male sensory time window . . . . . 189
Helversen, D. von, see Heller, K.-G. . . . . 189
Higgins, B.I., see Beletsky, L.D., et al. . . . . 221
Hofmann, J.E., see Getz, L.L. . . . . 275
Hölldobler, B., Carlin, N.F.: Colony founding, queen dominance and oligogyny in the Australian meat ant *Iridomyrmex purpureus* . . . . . 45
Houston, A.I., see Barnard, C.J., et al. . . . . 139
Huck, U.W., see Labov, J.B., et al. . . . . 241
Hunter, L.A.: The effects of helpers in cooperatively breeding purple gallinules . . . . . 147
Isaaks, J.A., see Boomsma, J.J. . . . . 19
Janson, Ch.: Aggressive competition and individual food consumption in wild brown capuchin monkeys (*Cebus apella*) . . . . . 125
Kaiser, H.: Availability of receptive females at the mating place and mating chances of males in the dragonfly *Aeschna cyanea* . . . . . 1

Kaiser, H., see Poethke, H.-J. . . . . 155
Kiepenheuer, J.: Can pigeons be fooled about the actual release site position by presenting them information from another site? . . . . . 75
Kirchner, W.H., see Michelsen, A., et al. . . . . 207
Klump, G.M., Kretzschmar, E., Curio, E.: The hearing of an avian predator and its avian prey . . . . . 317
Knerer, G., see Packer, L. . . . . 363
Kretzschmar, E., see Klump, G.M., et al. . . . . 317
Labov, J.B., Huck, U.W., Vaswani, P., Lisk, R.D.: Sex ratio manipulation and decreased growth of male offspring of undernourished golden hamsters (*Mesocricetus auratus*) . . . . . 241
Langbauer, W.R. Jr., see Payne, K.B., et al. . . . . 297
Lawrence, W.S.: Male choice and competition in *Tetraopes tetraophthalmus*: effects of local sex ratio variation . . . . . 289
Lee, Ph. C, Moss, C.J.: Early maternal investment in male and female African elephant calves . . . . . 353
Leffelaar, D., Robertson, R.J.: Equality of feeding roles and the maintenance of monogamy in tree swallows 199
Lenington, S., see Franks, P. . . . . 395
Lindauer, M., see Michelsen, A., et al. . . . . 207
Lisk, R.D., see Labov, J.B., et al. . . . . 241
Littlejohn, M.J., see Harrison, P.A. . . . . 67
Madison, D.M., see McShea, W.J. . . . . 431
Malcolm, S.B.: Aposematism in a soft-bodied insect: a case for kin selection . . . . . 387
McGregor, P.K., Avery, M.I.: The unsung songs of great tits (*Parus major*): learning neighbours' songs for discrimination . . . . . 311
McNamara, J.M., see Barnard, C.J., et al. . . . . 139
McShea, W.J., Madison, D.M.: Sex ratio shifts within litters of meadow voles (*Microtus pennsylvanicus*) . . 431
Michelsen, A., Kirchner, W.H., Lindauer, M.: Sound and vibrational signals in the dance language of the honeybee, *Apis mellifera* . . . . . 207
Moss, C.J., see Lee, Ph. C. . . . . 353
Nagel, B., see Erkert, H.G., et al. . . . . 443
Orians, G.H., see Beletsky, L.D., et al. . . . . 221
Packer, L., Knerer, G.: The biology of a subtropical population of *Halictus ligatus* Say (Hymenoptera: Halictidae). I. Phenology and social organisation . . . . . 363
Page, R.E., see Crozier, R.H. . . . . 105
Pasteels, J.M., see Roisin, Y. . . . . 437
Payne, K.B., Langbauer, W.R. Jr., Thomas, E.M.: Infrasonic calls of the Asian elephant (*Elephas maximus*) 297
Peeters, Ch., Crewe, R.: Worker reproduction in the ponerine ant *Ophthalmopone berthoudi*: an alternative form of eusocial organization . . . . . 29
Poethke, H.-J., Kaiser, H.: A simulation approach to evolutionary game theory: the evolution of time-sharing behavior in a dragonfly mating system . . . . . 155
Rand, A.S., see Burghardt, G.M. . . . . 101
Reynolds, J.D., Colwell, M.A., Cooke, F.: Sexual selection and spring arrival times of red-necked and Wilson's phalaropes . . . . . 303
Robertson, R.J., see Leffelaar, D. . . . . 199
Robinson, S.K.: Fighting and assessment in the yellow-rumped cacique (*Cacicus cela*) . . . . . 39
Roisin Y., Pasteels, J.M: Replacement of reproductives in *Nasutitermes princeps* (Desneux) (Isoptera: Termitidae) . . . . . 437
Röseler, I., see Röseler, P.-F., et al. . . . . 9
Röseler, P.-F., Röseler, I., Strambi, A.: Role of ovaries and ecdysteroids in dominance hierarchy establishment among foundresses of the primitively social wasp *Polistes gallicus* . . . . . 9
Saitō, Y.: Biparental defence in a spider mite (Acari: Tetranychidae) infesting *Sasa* bamboo . . . . . 377
Sargent, R.C., see Coleman, R.M., et al. . . . . 59
Shapiro, L.E., Dewsbury, D.A.: Male dominance, female choice and male copulatory behavior in two species of voles (*Microtus ochrogaster* and *Microtus montanus*) 267
Simpson, A.E., Simpson, M.J.A.: Short-term consequences of different breeding histories for captive rhesus macaque mothers and young . . . . . 83
Simpson, M.J.A., see Simpson, A.E. . . . . 83
Stacey, P.B.: Group size and foraging efficiency in yellow baboons . . . . . 175
Stephani, I., see Erkert, H.G., et al. . . . . 443
Strambi, A., see Röseler, P.-F., et al. . . . . 9
Svärd, L., Wiklund, Ch.: Different ejaculate delivery strategies in first versus subsequent matings in the swallowtail butterfly *Papilio machaon* L. . . . . 325
Thomas, E.M., see Payne, K.B., et al. . . . . 297
Trillmich, F., see Trillmich, K.G.K. . . . . 259
Trillmich, K.G.K., Trillmich, F.: Foraging strategies of the marine iguana, *Amblyrhynchus cristatus* . . . . 259
Tyack, P.: Whistle repertoires of two bottlenosed dolphins, *Tursiops truncatus*: mimicry of signature whistles? . . . . . 251
Vaswani, P., see Labov, J.B., et al. . . . . 241
Visscher, P.K.: Kinship discrimination in queen rearing by honey bees (*Apis mellifera*) . . . . . 453
Vollrath, F.: Eusociality and extraordinary sex ratios in the spider *Anelosimus eximius* (Araneae: Theridiidae) 283
Whoriskey, F.G., FitzGerald, G.J.: Sex, cannibalism and sticklebacks . . . . . 15
Wiklund, Ch., see Svärd, L. . . . . 325
Zahavi, A., see Carlisle, T.R. . . . . 339

Indexed in Current Contents